Anne Arundel County
Maryland

Innovative Watershed Management Tool for Restoration and Preservation in Anne Arundel County

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Project Background

- **Anne Arundel County is developing a comprehensive Watershed Management Master Plan for the Severn River**
- **Project Team: CH2M HILL and KCI Technologies, Inc., and GeoNorth**
- **Two Main Parts to project:**
  - traditional watershed management plan activities
  - development of Watershed Management Tool (WMT)

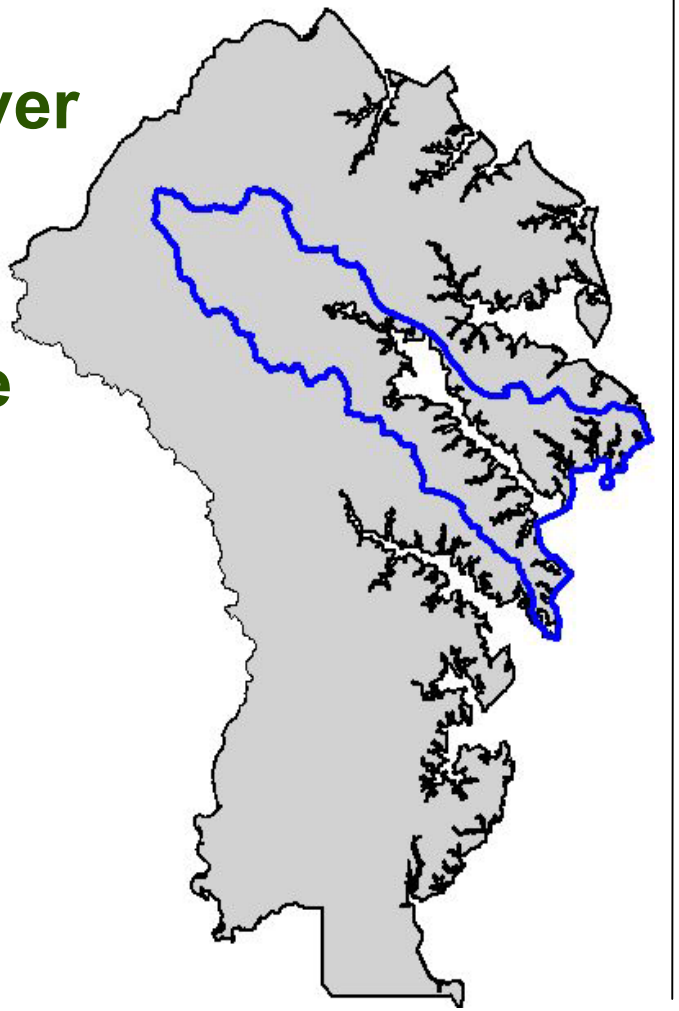
Vision

The Watershed Master Plan will provide a blueprint and tools to facilitate land use and infrastructure decisions by County Staff and Stakeholders to protect the resources of the Severn River.

Better Decisions for a Better Future

Project Area

- Current project area is Severn River Watershed
- Eventually incorporate all 12 watersheds of the County into the Watershed Management Tool



Summary and Overview of Watershed Management Tool

- **Utilized for:**
  - NPDES Permitting and Compliance
  - Watershed-Based Land Management & Land Use Planning
  - Development Review
  - Capital Improvement Planning

Overview of Functional Components of WMT

Data Warehouse Component
Spatial and Non-spatial Databases

Database Administrators

Planning & Zoning | Inspections & Permitting | Public Works

Modeling Component
Models and Interfaces

Interfaces/Analysts

- Input Retrieval and Output Storage
- Import and Export Functions
- Model Run Control
- Result Presentation/Interpretation/Analysis

Models

- Pollutant Loading Tool
- Stream Assessment Tool
- Hydrology Models/Analysis Tool
- Hydraulic Models/Analysis Tool
- Soil Erosion Model/Analysis Tool
- Estuary Model/Analysis Tool
- Groundwater and Surface Water Interactions

Watershed Management Tool

Internal Viewing Component
Intranet MapOptix

Intranet MapOptix

With New Watershed Data View/Query/Report Modules

Management Component
Interfaces and Administration

Data Integration

- Data Availability/Establishment
- Data Update/Monitoring

Workflow Management

- Modeling Requests
- Project Tracking and Fulfillment

Model Categories within WMT

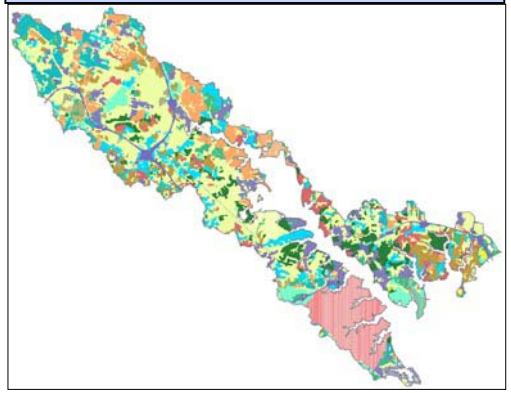
- Water Quality Modeling - Pollutant Loading
- Hydrologic & Hydraulic Modeling
- Soil Erosion Modeling
- Stream Assessment
- Groundwater / Surface Water Interactions

Pollutant Loading Model: PLOAD

- Based on the Simple Method
- Uses Event Mean Concentrations (EMCs)
- Encompasses a BMP point coverage
- Encompasses a Point source coverage
- Modeled current conditions, future conditions, and what-if scenarios

Modeling Tool: Pollutant Load Modeling

Land use



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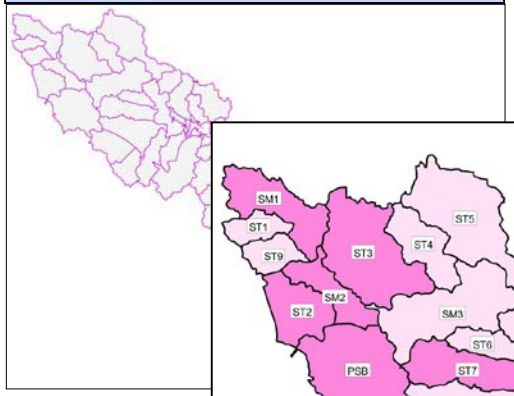
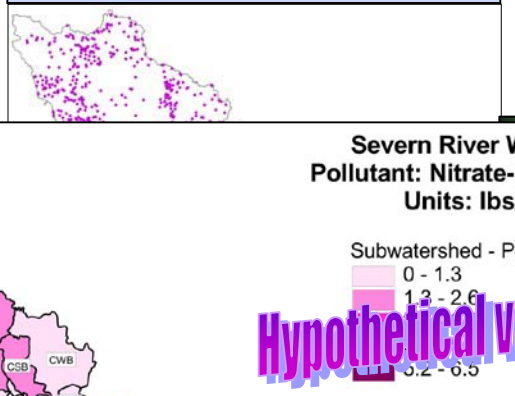
Subwatersheds

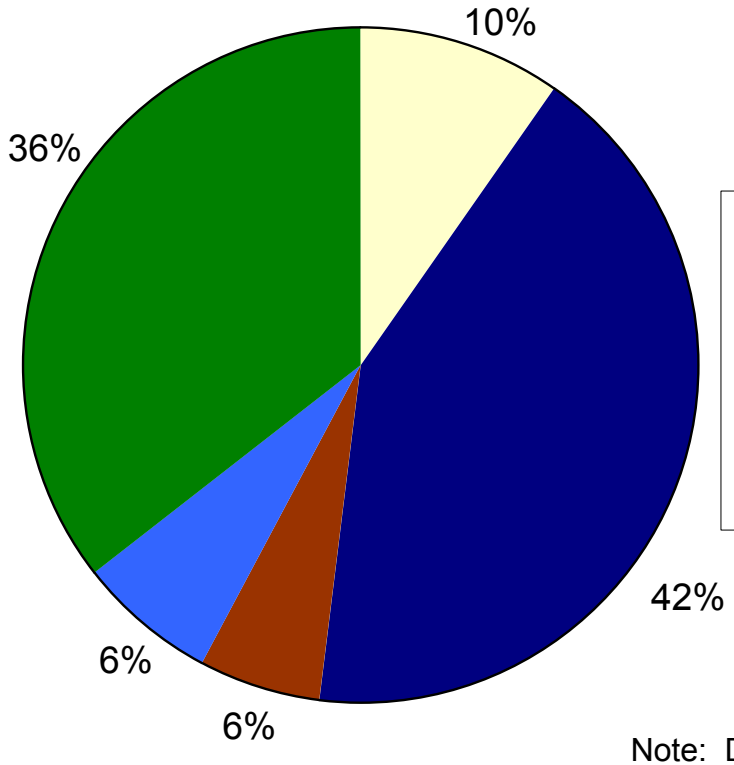


BMPs

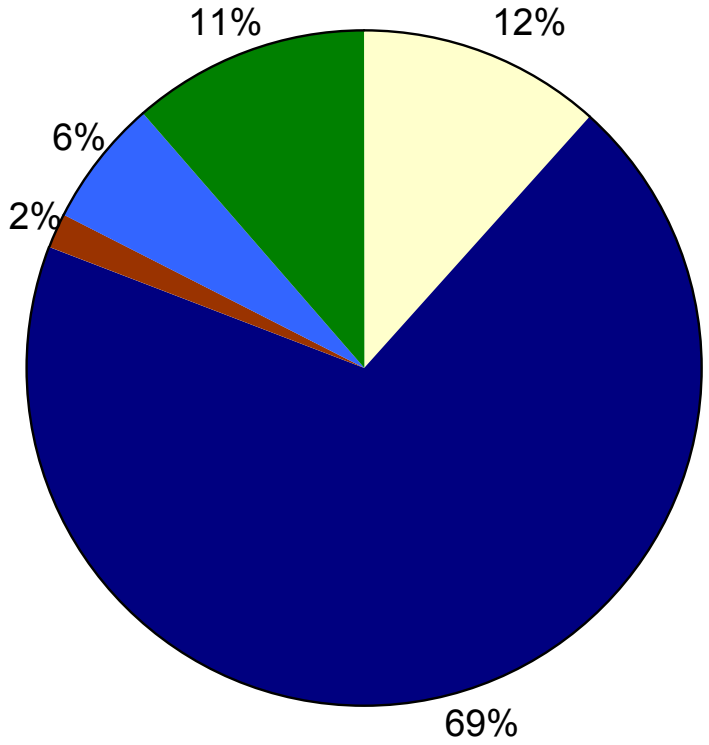


Existing Land Use Plan Projected Land Use Changes

Existing Conditions



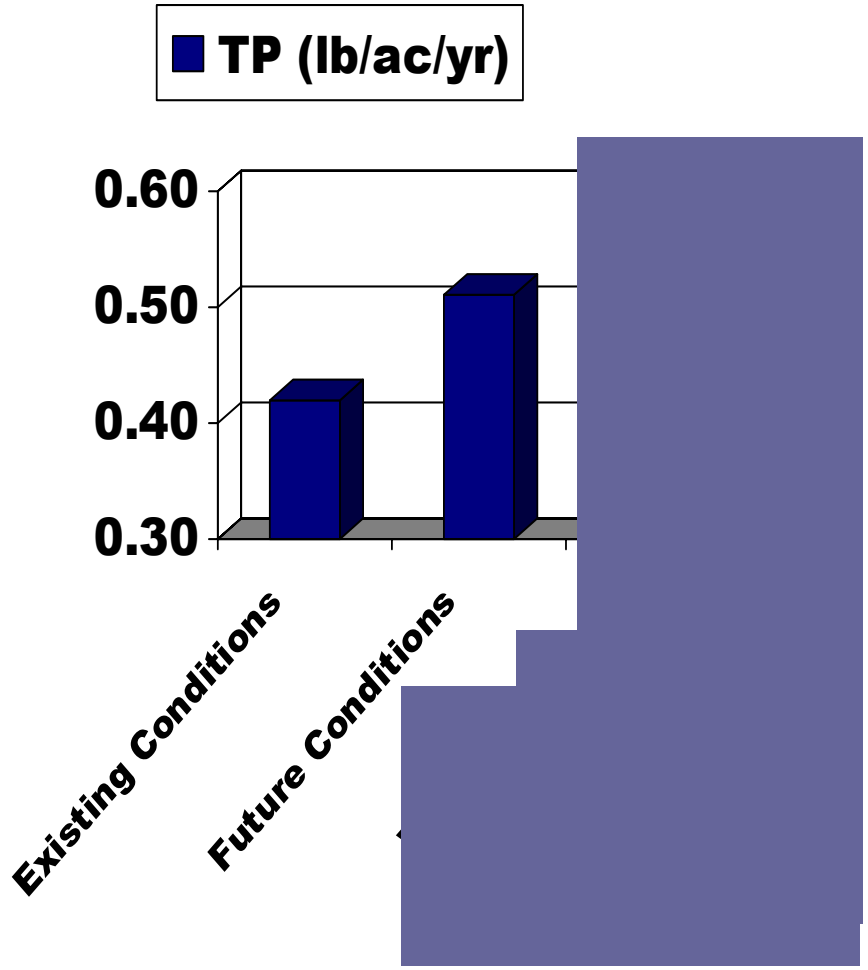
Future Conditions, with Existing Regulations



Commercial, Industrial, Transportation
Residential
Agricultural, Row Crop
Open Space (turf)
Woods

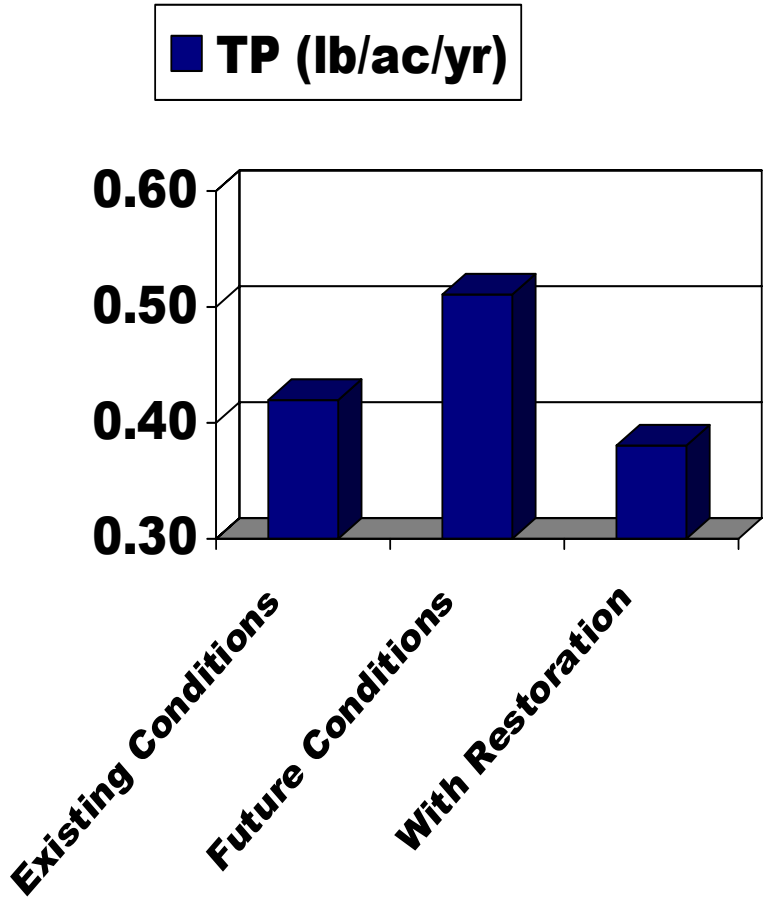
Note: Data does not include the City of Annapolis

Loading Rates of Total Phosphorus for Existing and Future Conditions



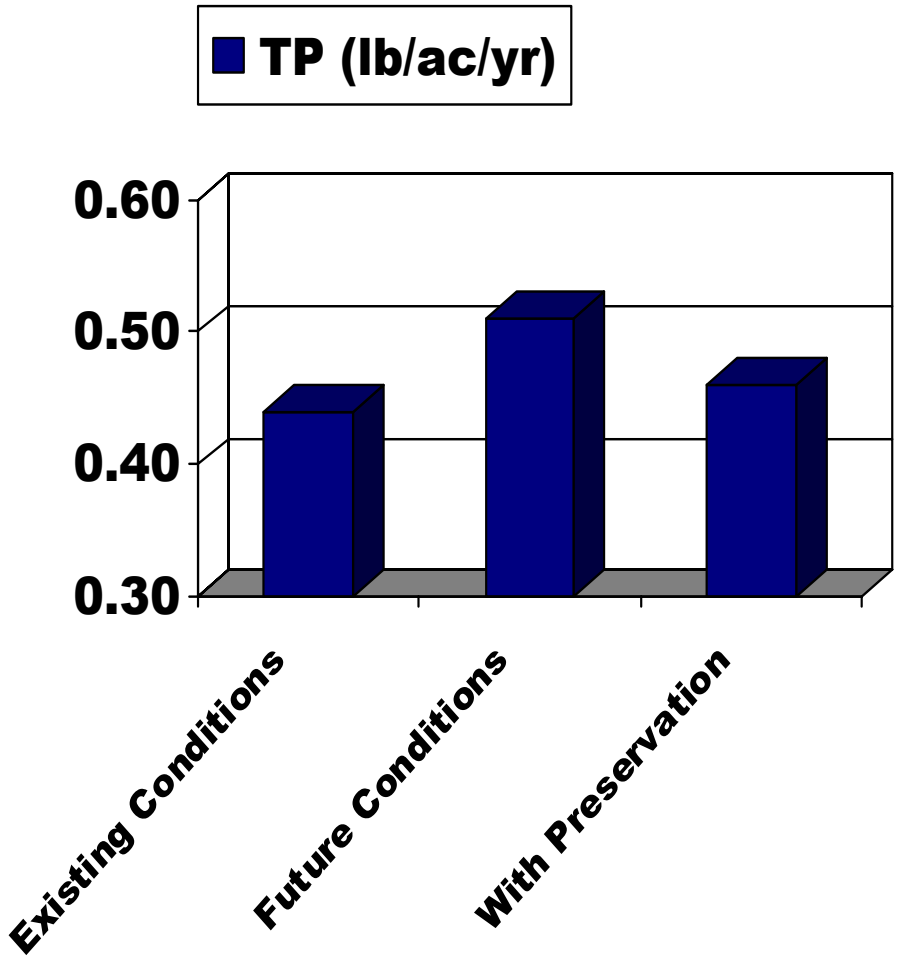
Considerations for Revised Land Use Plan - Possible Restoration Alternatives

- Bioretention
- Dry to Wet Pond Retrofits
- Wetland Mitigation
- Septic System Upgrades



Considerations for Revised Land Use Plan – Possible Preservation Alternatives

- Stream buffers and shoreline buffers (critical area)
- Greenways (100% of plan)
- Wetland mitigation sites
- Cluster zoning



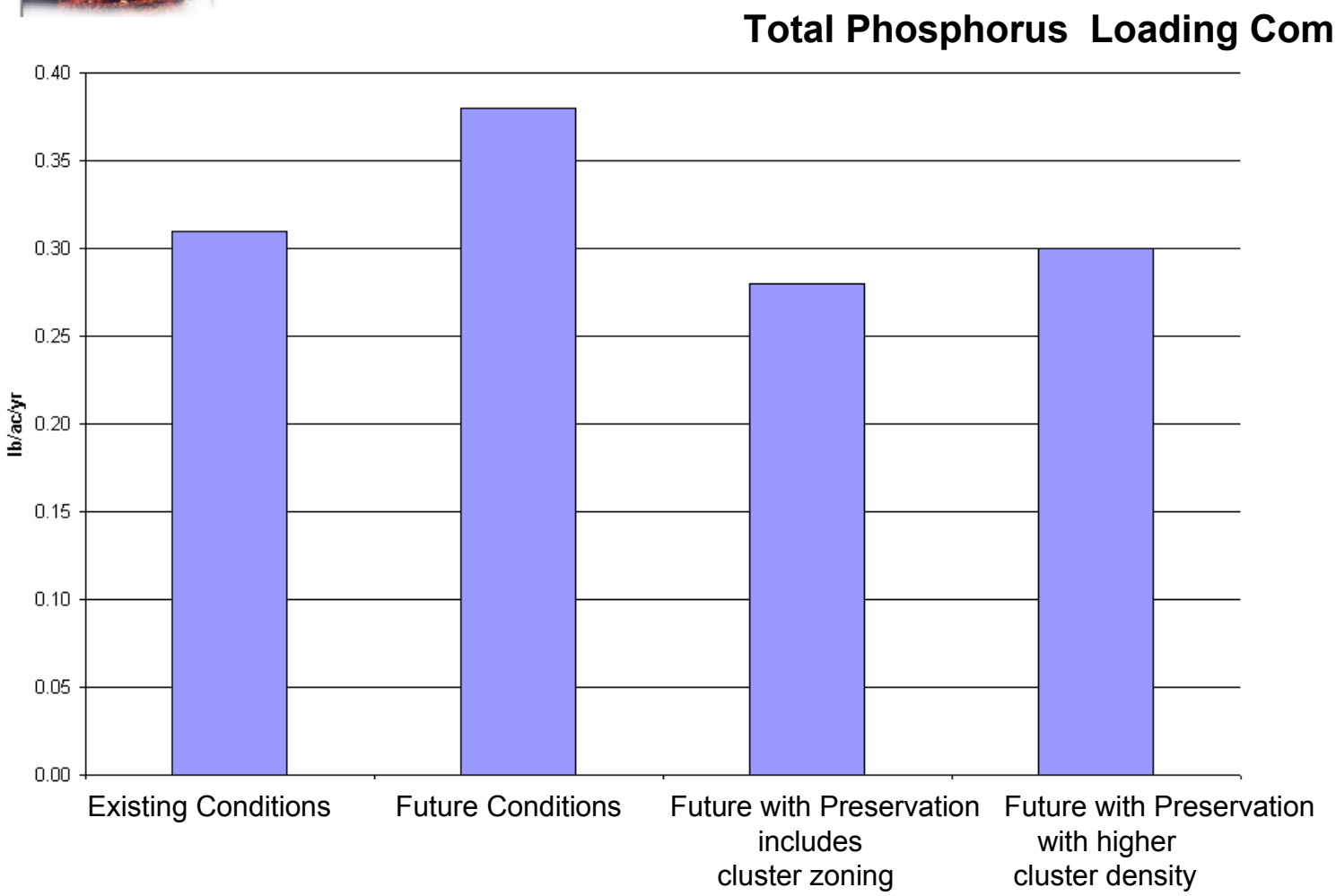
Potential Policy Considerations for Balancing Development and the Environment

WMT staff will investigate scenarios such as:

- **Cluster Zoning – decrease lot size while maintaining number of units on a site**
- **Septic System Alternatives – replace conventional septic systems with treatment systems having better pollutant removal**

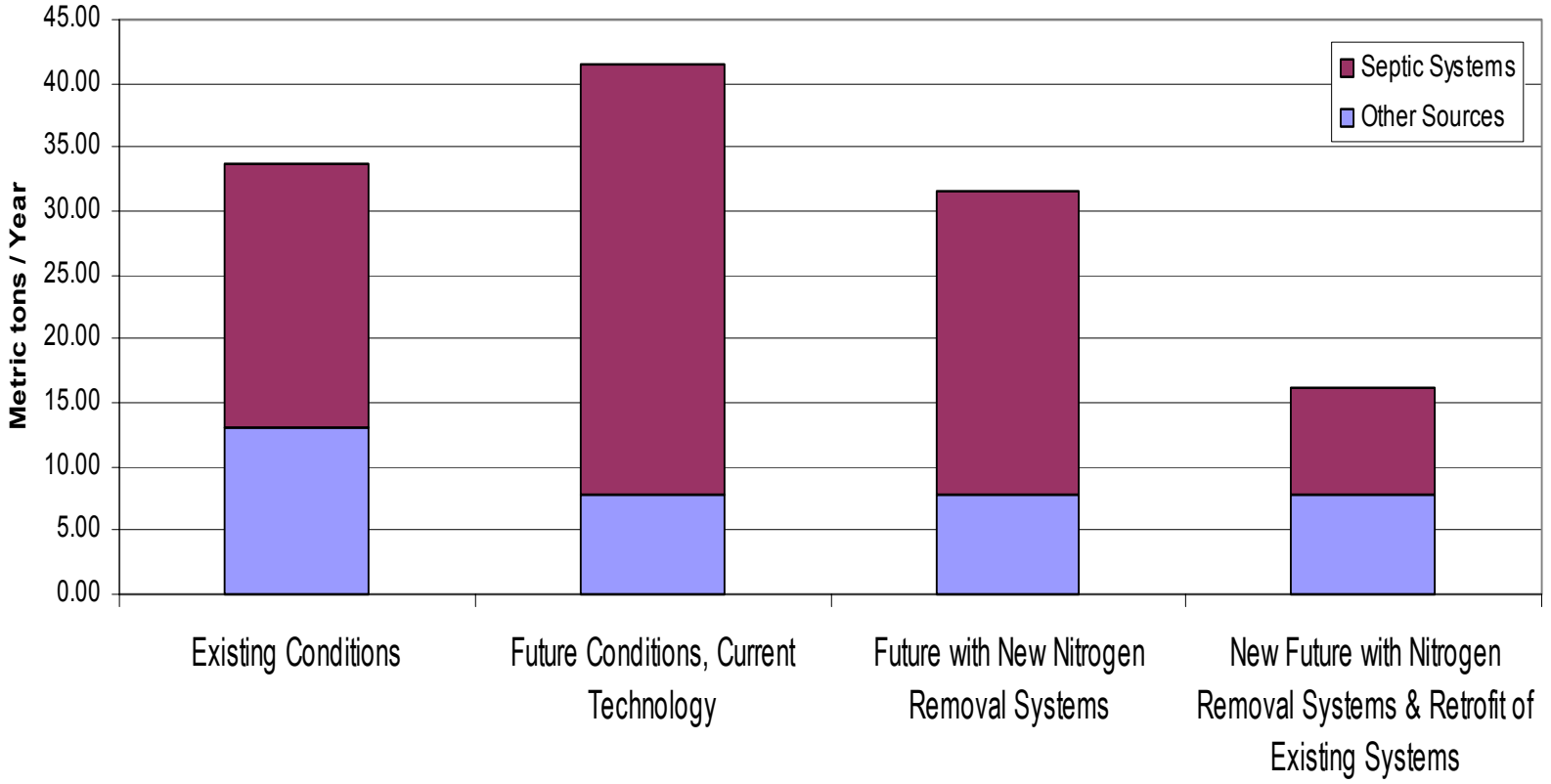
In order to facilitate better land use decisions.

Cluster Development



Septic System Alternatives

Total Nitrogen Loading Comparison



Summary and Final Thoughts

- Experiencing stressors and changes in land use
- Utilizing Watershed Studies and Technological Tools
- Increasing regulatory responsibilities, but decreasing resources
- Growing backlog of restoration projects
- Need for innovative methods to address these problems

Questions & Answers